

Investigation

Infinite Growth on a Finite Planet: *The Limits to Growth Today*

In Episode 9: At the Tipping Point, Katy Shields takes listeners back to 1972, when a team of young scientists led by Dennis and Dana Meadows published *The Limits to Growth*. This study explored what would happen to human civilization if people kept pursuing endless economic growth on a finite planet.

One of the team's most famous outcomes is called the Standard Run – a scientific model showing how the world might change if industrial production and human population continued to grow at the rates they were growing in the 1960s and early 70s.

Here's an explanation of the Standard Run from the episode, alongside the model from *The Limits to Growth*:

Katy Shields: For the first few decades, expansion was rapid and the global economy, and with it, pollution, ballooned.

Australian news broadcast host: From 1980 to the year 2020 pollution really takes off, so by the year 2020 the condition of the planet starts to become highly critical.

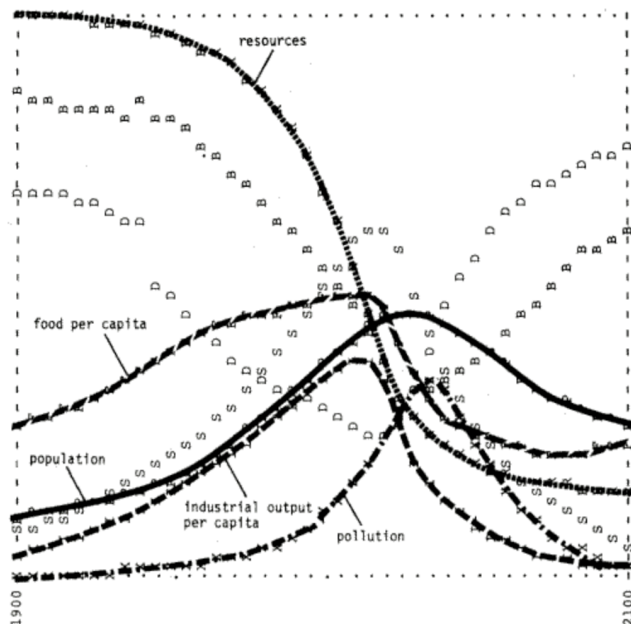
Katy Shields: But with limited measures to use [natural] resources more judiciously, a rise in consumption combined with exponential growth in pollution started impacting food supplies and then of course human health.

Australian news broadcast host: Pollution is going to become so serious that it will start to kill people! So the population will diminish, and at this stage, around about the year 2040-2050, civilized life as we know it on this planet will cease to exist.

Katy Shields: They were not talking about the end of life as we know it, but as Dana herself later explained:

Dana Meadows: if we run into those limits, what will happen will be a collapse of our system, not necessarily the Earth system, but the industrial system.

Figure 35 WORLD MODEL STANDARD RUN



The Limits to Growth didn't stop with the Standard Run, however.

The team created scientific models of scenarios that might result in a different outcome. Some of these scenarios explored whether new technologies – new sources of energy, new forms of food production to increase agricultural yields, or new methods of cleaning up pollution – could allow industrial production, human population, and the economy to continue growing while staying within the Earth's limits.

Their models showed that technological advances could delay environmental limits but not eliminate them. Because different parts of the Earth and human systems were interconnected, technologies that addressed one problem could create new pressures elsewhere. For example, technologies that increased food production could also increase pollution, while technologies that reduced pollution could require additional energy and resources. As industrial production continued to grow, these pressures eventually pushed the system beyond other limits, leading to industrial collapse.

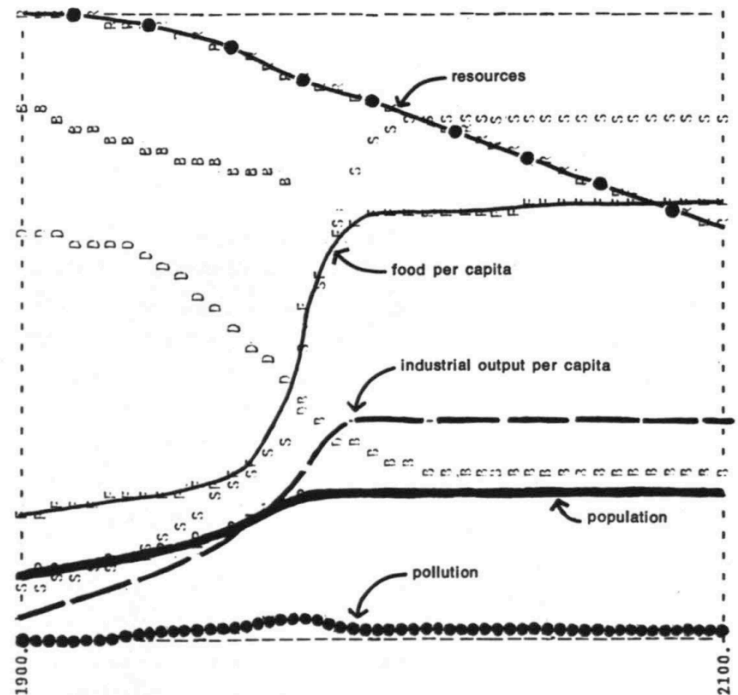
Concluding that technological innovation alone could not make endless industrial growth sustainable, the scientists created a final model, the Stabilized World Model, that deliberately limited growth in population and industrial production. This scenario avoided pushing beyond planetary limits and could be sustained over time.

The team's results were widely ridiculed. Critics argued that the models underestimated human ingenuity and technological change: as environmental problems become more urgent, they reasoned, people would develop cleaner energy sources, use resources more efficiently, and find new ways to produce more with less.

More than fifty years later, versions of this debate continue. Renewable energy, electric vehicles, and other technologies have made it possible to reduce some environmental impacts even as economies grow. At the same time, these technologies *themselves* require resources and materials, and producing them can create new environmental and human costs.

In this investigation, you'll examine contemporary sources to consider how the debate raised by *The Limits to Growth* continues today.

Figure 46 STABILIZED WORLD MODEL I



Guiding Questions

- What arguments are people making today about whether new technologies can allow economies to keep growing while staying within the limits of a finite planet?
- What do the resources required for new technologies – and the ways those resources are extracted – add to the debate?

Source

"Can the Economy Grow Forever?" by TED-Ed in collaboration with the World Economic Forum (August 11, 2022)

This 6-minute, 3-second video from TED-Ed explores an ongoing debate among economists about whether economies can continue to grow while reducing their use of natural resources and their environmental impact.

Source

"Could humanity be sustainable? It's not as hopeless as you think" from TED Radio Hour (January 12, 2024)

In this 14-minute episode of *TED Radio Hour*, host Manoush Zomorodi interviews Dr. Hannah Ritchie, senior researcher at the University of Oxford and deputy editor of Our World in Data. In 2024, Ritchie published the book *Not The End Of The World: How We Can Be The First Generation To Build A Sustainable Planet*. She considers whether it is possible to provide a good life for a growing population while reducing humanity's negative impact on the environment. (You can also find a transcript via the link above.)

Source

"Child labour, toxic leaks: the price we could pay for a greener future" by Robin McKie for The Guardian (January 3, 2021)

In this article, Robin McKie examines the natural resources needed to produce greener technologies like electric vehicles, solar power, and wind farms. Drawing on the work of scientists and researchers, he describes some of the environmental and human impacts that could accompany growing demand for these technologies.